EXERCISE 11.1

Choose the correct answer from the given four options:

1. If the sum of the areas of two circles with radii *R*1 and *R*2 is equal to the area of a circle of radius *R*, then

(A) $R_1 + R_2 = R$ **(B) $R_1^2 + R^{\ 2} = R^2$**

(C) $R_1 + R_2 < R$ **(D) $R_1^2 + R^{\ 2} < R^2$**

Solution:

(B) $R_1^2 + R^{\ 2} = R^2$

Explanation:

According to the question,

Area of circle = Area of first circle + Area of second circle

$\therefore \pi R^2 = \pi R_1^2 + \pi R^{\ 2}$

$\Rightarrow R^2 = R_1^2 + R^{\ 2}$

∴ Option B is correct.

2. If the sum of the circumferences of two circles with radii *R*1 and *R*2 is equal to the circumference of a circle of radius R, then

(A) $R_1 + R_2 = R$ **(B) $R_1 + R_2 > R$**

(C) $R_1 + R_2 < R$ **(D) Nothing definite can be said about the relation among R_1, R_2 & R.**

Solution:

(A) $R_1 + R_2 = R$

Explanation:

According to the question,

Circumference of circle with radius R = Circumference of first circle with radius R_1 + Circumference of second circle with radius R_2

$\therefore 2\pi R = 2\pi R_1 + 2\pi R_2$

$\Rightarrow R = R_1 + R_2$

∴ Option A is correct.

3. If the circumference of a circle and the perimeter of a square are equal, then

(A) Area of the circle = Area of the square

(B) Area of the circle > Area of the square

(C) Area of the circle < Area of the square

(D) Nothing definite can be said about the relation between the areas of the circle & square.

Solution:

(B) Area of the circle > Area of the square

Explanation:

According to the question,

Circumference of a circle = Perimeter of square

Let r be the radius of the circle and a be the side of square.

∴ From the given condition, we have $2\pi r = 4a$

$(22/7)r = 2a$

$\Rightarrow 11r = 7a$

$\Rightarrow a = (11/7)a$

$\Rightarrow r = (7/11)a$..................(i)

Now, area of circle = $A_1 = \pi r^2$ and area of square = $A_2 = a^2$

From equation (i), we have

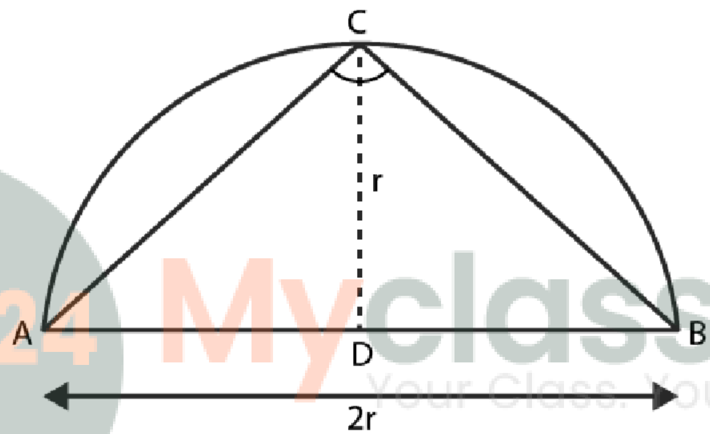
$A_1 = \pi \times (7/11)^2$

$= (22/7) \times (49/121)a^2$

= $(14/11)a^2$ and $A_2 = a^2$
∴ $A_1 = (14/11)\ A_2$
⇒ $A_1 > A_2$
Hence, Area of the circle > Area of the square.
∴ Option B is correct.

4. Area of the largest triangle that can be inscribed in a semi-circle of radius *r* units is
(A) r^2 sq. units **(B) ½ r^2 sq. units**
(C) $2\ r^2$ sq. units **(D) $\sqrt{2}\ r^2$ sq. units**

Solution:
(A) r^2 sq. units
Explanation:
The largest triangle that can be inscribed in a semi-circle of radius r units is the triangle having its base as the diameter of the semi-circle and the two other sides are taken by considering a point C on the circumference of the semi-circle and joining it by the end points of diameter A and B.



∴ ∠ C = 90° (by the properties of circle)
So, ΔABC is right angled triangle with base as diameter AB of the circle and height be CD.
Height of the triangle = r
∴ Area of largest ΔABC = (1/2)× Base × Height = (1/2)× AB × CD
= $(1/2)\times 2r \times r = r^2$ sq. units
∴ Option A is correct.

5. If the perimeter of a circle is equal to that of a square, then the ratio of their areas is
(A) 22 : 7 **(B) 14 : 11** **(C) 7 : 22** **(D) 11: 14**

Solution:
(B) 14 : 11
Explanation:
Let r be the radius of the circle and a be the side of the square.
According to the question,
Perimeter of a circle = Perimeter of a square
⇒ $2\pi r = 4a$
⇒ $a = \pi r/2$
Area of the circle = r^2 and Area of the square = a^2
Now, Ratio of their areas = (Area of circle)/(Area of square)

$$= \frac{\pi r^2}{a^2} = \frac{\pi r^2}{\left(\frac{\pi r^2}{2}\right)^2} = \frac{\pi r^2}{\frac{\pi^2 r^2}{4}}$$

= 4/π
= [4/(22/7)]
= 14/11
∴ Option B is correct.